Special Issue on "Strong Coupling of Molecules to Cavities" Editorial

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Special Issue on "Strong Coupling of Molecules to Cavities"

Strong coupling of ensembles of molecules with confined light fields has exploded as a research topic in the past few years. This special issue of *ACS Photonics* marks an important 'coming of age' in the formation of a community of scientists working on this dynamic topic; it is the offspring of the first international workshop specifically focussed on this topic.

The idea for a workshop emerged at a symposium at the AMOLF institute in the Netherlands in honour of Prof. Jaime Gomez-Rivas, to mark his move from AMOLF to take up a new position at Differ, the Dutch energy research organisation in Eindhoven. Jaime was precluded by other editorial commitments from joining us for this special issue, but he was very much involved with us in organising the workshop. We were fortunate to host the workshop at the Donostia International Physics Centre in San Sebastian, Spain, a very convivial and attractive venue with a strong record for top-level scientific meetings. Towards the end of the meeting one of the invited speakers, Prof Harry Atwater (Caltech), suggested a special issue of *ACS Photonics* might be devoted to the topic of the meeting. This special issue is a direct result of that suggestion and provides an embellished follow-up of the work discussed at the meeting, now available to a wider audience. We were delighted that so many contributors accepted the invitation to contribute.

This workshop brought together researchers from different disciplines including: photonics, quantum optics, materials, chemistry and condensed matter physics to discuss the latest developments in the study of the strong coupling involving organic molecules and optical cavities. Leaders in the field presented and discussed recent results on phenomena that involve polaritonic states, molecular excitations, molecular vibrations and their complex interactions, giving rise to a plethora of fascinating effects of both scientific and technological interest. Many of those discussions are shaped in included in this special issue, and our aim is that the articles collected could act as a catalyst in this emerging field, encouraging further development of the underlying concepts and promoting new directions and collaborations.

Strong coupling of ensembles of organic molecules with confined light fields was reported many years ago by Lidzey et al. in 1998. Although interest gradually picked up in the years that followed, it was the pioneering work of Ebbesen and co-workers through a slew of fascinating results over the past five years or so that demonstrated the power of strong coupling to modify molecular and material properties. We were delighted that both Lidzey and Ebbesen could take part in the workshop, and that they have contributed to this special issue.

The special issue comprises two reviews, three perspectives a number of letters together with a raft of standard articles. Together they capture the stat-of-the-art of this fascinating topic, and highlight the great potential this area has for future developments.

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